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Federal Communications Commission
445 12th St., S.W.
Washington, D.C. 20554

Lifeguard Health Networks, Inc. is pleased to respond to the FCC announcement seeking comment and data on actions to accelerate adoption and accessibility of broadband-enabled healthcare solutions and advanced technologies.

FCC 17-46 / Released: April 24, 2017 / GN Docket No. 16-46 / Comment Date: June 8, 2017

I. Promoting effective policy and regulatory solutions that encourage broadband adoption and promote health IT.

"Connectivity Opportunities"

FEWER HEALTH CARE PROVIDERS ARE AVAILABLE IN RURAL AREAS

Less than 11 percent of physicians in the U.S. practice in rural areas, yet about 20 percent of the population resides in rural areas. Provider recruitment and retention problems in rural areas are related to several factors including lower salaries, geographic isolation from peers and educational opportunities, and fewer amenities such as schools and recreation. The Department of Health and Human Services recommends a provider-to-patient ratio of one primary care physician to every 2,000 individuals. Over 20 million rural Americans live in areas that have a provider-to-patient ratio of 1 to 3,500 or less and are federally designated as health professional shortage areas (HPSAs). More than 2,200 physicians are needed to remove the HPSA designation from all rural areas, but more than twice that number is needed to achieve the recommended ratio of 1 to 2,000 in these areas.[4]

Intrinsic to most technologies, there are advantages related to scale that can help address the short fall in the ratio of service and health delivery providers to patients. Even if the scale advantage is a minimal factor of 2, many rural areas in the country could conceivably meet recommended ratios of provide-to-patient without adding any new providers in that underserved area. This assuming that telemedicine (and telehealth) is viewed as a viable complement and enhancement to in-person encounters.

4. North Carolina Rural Health Research Program (1997). Facts About...Rural Physicians. Washington, DC: Federal Office of Rural Health Policy, U.S. Dept. of Health and Human Services.

TELEMEDICINE CAN BRING SERVICES TO UNDERSERVED AREAS

Telemedicine offers the potential to provide health care services across vast distances to underserved urban and rural areas. Telemedicine is the use of electronic communication and information technologies to provide clinical care at a distance. It can provide individuals in rural areas access to teleconsultations with health care providers and specialists that otherwise may not occur. Telemedicine may also help attract and retain health care providers in rural areas by providing ongoing training and interaction with other providers.

The lack of insurance reimbursement has been a barrier to bringing telemedicine into underserved areas, but is likely to be less of a factor in the future. The Medicare, Medicaid, and SCHIP Beneficiary

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Improvement and Protection Act of 2000 allows Medicare to fully reimburse the consulting physician in a teleconsultation with a patient and referring physician. The Act also permits Medicare to provide teleconsultations in all rural areas.[8] As of June 2002, 18 states provided Medicaid reimbursement for telemedicine and 2 states were developing plans to cover telemedicine.[9] Several states, including California, Louisiana, and Texas, have passed laws requiring private insurance companies to cover telemedicine.[10]

[8] *MEDPAC (2001). Report to the Congress: Medicare in Rural America. Washington, DC: MEDPAC.*
[9] *Center for Medicare and Medicaid Services (June 5, 2002). Medicaid and Telemedicine.*
[10] *Orloff, T. (1998). State Challenges and Opportunities in Rural and Frontier Health Care Delivery. Washington, DC: National Governors' Association.*

II. Identifying regulatory barriers (and incentives) to the deployment of RF-enabled advanced health care technologies and devices.

"Adoption"

The most promising aspect of opportunity for the benefit of healthcare consumers is the growth of standard mobile phone *and* smartphone adoption across virtually all socioeconomic strata. In recent years, older Americans have been one of the fastest growing segments in smartphone adoption[1]. In addition, there has also been an increase in smartphone ownership among households earning less than $30,000 per year.

% of U.S. adults who own the following devices

	Any cellphone	Smartphone
Total	95%	77%
Men	96%	78%
Women	94%	75%
White	94%	77%
Black	94%	72%
Hispanic	98%	75%
Ages 18-29	100%	92%
30-49	99%	88%
50-64	97%	74%
65+	80%	42%
Less than high school graduate	92%	54%
High school graduate	92%	69%
Some college	96%	80%
College graduate	97%	89%
Less than $30,000	92%	64%
$30,000-$49,999	95%	74%
$50,000-$74,999	96%	83%
$75,000+	99%	93%
Urban	95%	77%
Suburban	96%	79%
Rural	94%	67%

Source: Survey conducted Sept. 29-Nov. 6, 2016.
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With continuous and growing increase of smartphone ownership, and the associated number of various "health apps" that have been brought to market, the healthcare consumer – the patient – has the potential to be better and more connected to their health information, and even to their healthcare provider.

III. Strengthen the nation's telehealth infrastructure through the FCC's Rural Health Care (RHC) Program and other initiatives.

"Rural Communities"

Discussions on "the last mile" have been going on for more than 10 years. The Rural Health Care (RHC) Program, has made the benefits of broadband-enabled health services, such as telehealth and telemedicine, more available to consumers in rural and remote areas. The FCC's RHC Program as a whole, including its regulatory framework and the manner in which it is administered, remains effective, but in order to keep pace with changes in the delivery of health care, it must keep pace with technological developments. Broadband is essential, and as technology "rails", further support is required to grow opportunities in the development and deployment of technologies, especially mobile technologies, put access into the hands of patients/consumers.

Populations that cause the highest costs to the healthcare system include elderly and highly compromised patients – those with multiple comorbidities and those with complex, often debilitating conditions, such as cancer. For these populations, it most frequently falls to the caregiver at home to provide support necessary for the care of such patients. It becomes even more challenging for the family caregiver when the patient lives independently and there is, more often than not, no at-home support. In addition to these populations, minor children are completely dependent on their parents and guardians to provide critical at-home caregiving support. The ability for a parent of a child with compromised health to have tools, and a mechanism to communicate with the clinical team provides a means to enable a more informed and supported caregiver, with access to information as well as the child's clinical team.

IV. Raising consumer awareness about the value proposition of broadband in the health care sector and its potential for addressing health care disparities.

"PR to Consumer"

Although positive health outcomes can be derived by direct use of broadband-enabled health technologies and services today, many consumers remain unaware about their benefits or as options to receiving care. Access to broadband Internet services alone can enable consumers to self-manage their well-being. Lifeguard is uniquely positioned to support consumer awareness. From its inception, Lifeguard has incorporated both "technology and initiative" in its corporate DNA. Today, Lifeguard has relationships with very high profile organizations, which are deeply engaged in mission around specific disease states. The organizations are focused on clinical, research and public relations aspects of "getting the word out" to their target populations. One such organization is completely focused on consumer awareness and has celebrity endorsements which supports today's pervasive pop culture consumer. The broad approach directly and indirectly reaches all populations, including underserved populations including poor urban and poor rural communities as well as older Americans, people with disabilities, and veterans.

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V. Enabling the development of broadband-enabled health technologies that are designed to be fully accessible to people with disabilities.

"Disabled/Compromised Patients"

Consider that all patients that require at-home care are compromised to some degree. Included in this population are patients that are technically, at least temporarily, disabled in some way. Technologies that provide enablement for compromised patients can offer supportive benefits. However, these technologies, which provide pathways to engage compromised/disabled populations, are not widely available and tend to be highly sophisticated – and expensive. On the other hand, there are some technologies today that can enable duly authorized patient proxies to support patients that are so compromised that they are unable to self-manage their conditions at home. A patient's caregivers have traditionally provided support, encouragement and physical care but are often a forgotten resource within the health system. The impact of engaging patient proxies to support patients offers great promise. These technologies, such as LifeguardMOBILE, are intuitive, inexpensive and available today. Patient proxies, most often family members, are highly motivated to support health improvement and can easily engage on behalf of their loved ones.

Age Distribution of Persistent High (healthcare cost) Spenders

Age Range (in years)	Percent of Persistent High Spender Population
65+	42.9%
45–64	40.1%
30–44	10.6%
18–29	3.1%
0–17	3.4%

Source: Steven B. Cohen and William Yu, The Concentration and Persistence in the Level of Health Expenditures over Time: Estimates for the U.S. Population, 2008-2009, Statistical Brief (Rockville, MD: Agency for Healthcare Research and Quality, January 2012).

Mobile communications through digital health solutions do offer the prospect of better quality of life for the patient – either through direct patient engagement and activation, and/or via the family or friend caregiver who provides support for the patient at home, and who can potentially even serve as the patient's proxy – even as, with proper/appropriate clinical support, an extension of the clinical care team connected to that caregiver.

Identifying Target Population by Individual Patient Characteristics

Recurrent or Extensive Disease/Chronic Illness	• Diagnoses: Heart failure, chronic obstructive pulmonary disease (COPD), cancer, coronary disease, chronic kidney disease, peripheral vascular disease, diabetes, chronic liver disease, dementia, autoimmune disease, neurodegenerative/neuromuscular disease, and others, including geriatric frailty • Disease-specific indicators of advanced illness: Widespread cancer metastases, imaging evidence, significant laboratory abnormalities

Refractory Disease Process	• Cancer: 2nd line chemotherapy, others • Noncancer: Increasing diuretic dose in heart failure, resistance to bronchodilators in COPD, others
Accelerating Utilization	• Increasingly frequent hospitalizations • Increasingly frequent ED visits
Supplemental Factors	• Comorbid illness: Charlson comorbidity score • Advanced age • Self-reported state of health: fair to poor • Polypharmacy • Mental or behavioral health issues • Socioeconomic determinants: homelessness, poverty • Eligibility for hospice, but patient, family, or physician refuses enrollment

- Shelley R. Salpeter et al., "Systematic Review of Cancer Presentations with a Median Survival of Six Months or Less," Journal of Palliative Medicine 15, no. 2 (February 2012): 175–185.
- Shelley R. Salpeter et al., "Systematic Review of Noncancer Presentations with a Median Survival of 6 Months or Less," The American Journal of Medicine 125, no. 5 (May 2012): 512.e1–6.

The consumer tools that continue to be created for the patient are expanding, and becoming more sophisticated, including tools that more intelligently provide information to the patient, the caregiver and the physician/provider/clinical care team. However, just as a train needs rails, these tools require communication infrastructure to connect the various players and stakeholders. It is therefore critical that not only access and bandwidth be considered, but the tools also need to use such bandwidth efficiently. Apps and other consumer tools associated with IoT (Internet of Things) solutions, must be designed for maximum efficiency and minimal impact on wireless, broadband spectra.

VI. Highlighting effective telehealth projects, broadband-enabled health technologies, and mHealth applications across the country and abroad—to identify lessons learned, best practices, and regulatory challenges.

"Initiatives and Studies"

In June 2017, Journal of the American Medical Association (JAMA) published results http://jamanetwork.com/journals/jama/fullarticle/2630810 of a trial study that indicates success in using technology for Patient Reported Outcomes (PRO) to report symptoms in between doctor's visits. The results of this study of "routine cancer patients" strongly success the need to increase broadband to underserved areas. Without increasing broadband there is an increased risk in expanding the gap in disparities in health outcomes for patients in areas without access, as compared to patients in areas that have adequate broadband coverage. With specific regard to disparities, it is important to note that broadband coverage gaps impact all patients that live within these areas, which can be found in urban areas as well as rural areas across the country.

VII. Engaging a diverse array of traditional and non-traditional stakeholders to identify emerging issues and opportunities in the broadband health space.

"Emerging Opportunities and New Partnerships"

Lifeguard Health Networks is pleased to have the opportunity to be collaborating with a two significant health systems, one serving urban and the other rural underserved communities. Each organization is

submitting a separate response to the FCC's announcement (GN Docket No. 16-46). Admittedly there is a lot of overlap in the information submitted. However, each organization has some unique aspects regarding use of technology and unique markets. The common theme however, is Lifeguard technology's capabilities as an opportunity to provide greater access for a large percentage of the underserved patient population, and greater reach for the healthcare provider to engage with more of its patients. A critical element of the access and reach promised by technologies such as Lifeguard is the availability of infrastructure, i.e. broadband, even in the heart of urbanized areas as well as rural areas where there are technology and access gaps for underserved patient populations.

Following are just two of the healthcare organizations that Lifeguard is working with and who have collaborated with us in developing a response to the FFC's request for comments on the topic of broadband and the intersection of health delivery to various populations across the United States. Each of these organizations will submit their responses independently.

- Thomas Jefferson University/Jefferson Health – The largest academic and medical institution in Philadelphia. With more than 50% of its patient population coming from Philadelphia's Medicare-Medicaid population, Jefferson serves as a safety net hospital health care provider for Philadelphia's socioeconomically and medically underserved communities. (Philadelphia, PA)
- Mission Health System – Headquartered in Ashville and covering 18 mostly rural, economically depressed and underserved counties, Mission Health System is North Carolina's sixth-largest health system. Mission, western North Carolina's only not-for-profit, is an independent community hospital system governed and managed exclusively in western NC. (Ashville, NC)

With regard to technology and access, despite economic challenges, research from the Pew Research Center illustrates that those with lower incomes, especially those who earn below $30,000 annually, have higher smartphone ownership rates, and rates which have increased at a faster pace over time, as viewed from the perspective of those without broadband access from their home. From a healthcare perspective, this trend suggests that introducing broadband into these areas would bring with it the potential for greater engagement between patients and their clinical providers from their homes. This equals greater reach for healthcare providers, greater access for all patients.

% of U.S. adults who do not use broadband at home but own smartphones, by income

	Less than $30,000	$30,000-$49,999	$50,000-$74,999	$75,000+
2013	12%	9%	5%	5%
2015	20%	15%	10%	6%
2016	21%	12%	10%	5%

Source: Surveys conducted 2013-2016. Data for each year based on a pooled analysis of all surveys containing broadband and smartphone questions fielded during that year.

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BROADBAND BENEFIT EXAMPLE: REMOTE PATIENT CARE MANAGEMENT

Lifeguard: Technology that can benefit populations in underserved communities where access is built or increased through expansion of reliable broadband communication services.

Lifeguard Health Networks has built a platform based technology which takes full advantage of cloud services, enabling access anytime/anywhere (with broadband access) for patients and their caregivers to manage patient care and communicate passively (virtual triage of patient reported measures) and actively (phone, message, video) with their care providers. In rural, and urban areas as well, Lifeguard's low bandwidth requirements and intuitive engagement functionalities, enable a user-friendly experience that has the potential to support, engage and help patients and their at-home caregivers to better care for the patient.

The bandwidth requirement for Lifeguard's functional connectivity is met by the minimum speed of most currently enabled broadband – 3G and 4G – systems. This is more than enough to support all Lifeguard communication functionalities. The maximum requirements for Lifeguard is for its video service, which requires a minimal bandwidth of 300kbit/sec, which is within the minimum of 3G (400kbit/sec) broadband networks. Video services are not core to the technology's offering and is a nonessential element for Lifeguard's primary benefits to the patient, the patient's at-home caregiver and the clinical team. Even in a disconnected mode, Lifeguard provides functionality to its mobile users. Lifeguard is primarily asynchronous with regard to communication. Information that is entered into the Lifeguard application is updated to the cloud and made available to all permissioned caregivers and clinical team members the next time the application has connectivity.

Lifeguard Health Networks, Inc., and LifeguardMOBILE family of solutions background

The concept for the LifeguardMOBILE™ software, mobile technology and healthcare platform developed by Lifeguard Health Network ("LHN") is fundamentally rooted in recognizing the significant burden experienced by cancer caregivers and the need to connect them more intimately with their patients' care teams (see: https://lifeguardhealthnetworks.com). LifeguardMOBILE™ offers a flexible and customizable platform-based solution, which can be modified with feedback from patients, caregivers, and providers, and can evolve to meet changing requirements aligned with the patient's clinical needs, as well as his/her caregivers' needs.

Lifeguard is a new cutting-edge remote care coordination software platform and mobile technology solution. The Lifeguard solution creates a digital channel to the cancer patient, enabling (1) the activation and empowerment of the patient, (2) the informed mobilization of support of close friends and family (i.e. the "Circle of Care"; see below); and, (3) the provision of safe, high-quality, remote clinical support through a structured, best practice-based care plan. This solution helps patients that have complex conditions (e.g. cancer, renal/kidney disease, pulmonary/COPD, neurological/stoke, organ transplant, ALS, MS, dementia/Alzheimer's, etc.) and their caregivers to actively engage and become highly informed co-creators of their own health care plan, supported by friends and family, health condition care subject matter experts, and healthcare providers. Typically, patients with complex conditions and their at-home caregivers are highly motivated to engage in best practices and do not require additional "behavior change programs" to fully embrace in the best care practices provided to them by their care providers. This enablement essentially promotes a clinically supported extension of the care setting outside the hospital.

The Lifeguard solution provides a new, low-cost, mobile-based model of supported self-care for care coordination. This new approach to health service delivery reaches all socio-economic groups (through the already significant penetration of mobile devices across all socio-economic strata), particularly those with the lowest health literacy who need the greatest level of support. The Lifeguard platform, which supports LifeguardMOBILE (for healthcare consumers pursuing self-care and their caregivers), LifeguardRx (for more actively managed, clinician-directed patients and their caregivers), and LifeguardHCP (for healthcare providers and organizations), is flexible and easily modified.

Patient-level task domain dashboard features of LifeguardMOBILE and LifeguardRx (Figure 1):

For patients and caregivers, LifeguardMOBILE and LifeguardRx provide a rich mobile experience (fully supported on iOS and Android smart phones) that allows the user to configure a custom care plan, define caregiver permissions for access and privilege and set alert notification rules to keep family caregiver teams fully engaged and informed. LifeguardMOBILE supports patients who are recovering in a self-care scenario, involving the patient and their caregivers only. If a patient needs to initiate or return to clinician-managed care, the LifeguardMOBILE application can be simply converted to LifeguardRx, which allows for management and supervision by health care professionals. In either configuration, patient information that can be accessed by authorized users (e.g. family members and/or approved members of the healthcare team), receive reminders about medications, tests, and appointments, and maintain constant real-time access to their network of family and friends. These features aid patients in managing their day-to-day care, obtaining support from caregivers in real time, communicating accurately with their medical team, and identifying challenges in care between formal doctor visits.

Figure 1. Examples of ***patient-level*** dashboard features of the LifeguardMOBILE and LifeguardRx platforms for caregiver-supported self-care and clinician-managed patients, respectively. See text for details.

As illustrated in Figure 1, discrete elements of this dashboard include:

(1) *Managing Patient Care:* In consultation with the medical providers, patients can create a custom care plan to monitor and manage medications, vital signs, symptoms, and other self-reported care parameters.

(2) *Creating the Circle of Care:* Patients are able to invite others, such as trusted family and friends, to join their Circle of Care. Authorized Circle of Care members can monitor patient progress, provide support, and be reachable in times of need.

(3) *Track Progress:* Customizable windows allow medical reports and trends to be monitored by the patient and shared with caregivers. Healthcare providers can use this feature to make adjustments to care plans and take other corrective actions if needed.

(4) *Reminders and Alerts:* This window provides automatic reminders for scheduled activities such as medication, diet, and exercise. This dashboard element also alerts the patient and the Circle of Care to problems with some aspect of the care plan.

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Caregiver-level task domain dashboard features of LifeguardMOBILE and LifeguardRx (Figure 2):

In both LifeguardMOBILE and LifeguardRX, caregiver membership in the Circle of Care gives access to several dashboard features designed to facilitate patient monitoring and communication:

(1) *Notifications and Alerts:* Caregivers are sent system alerts and notifications (as pre-defined) when the patient is experiencing any medical issue.

(2) *Monitor Patient Progress:* Caregivers are able to view patient symptoms and vital sign trends, as well as medication adherence. This feature allows caregivers to track their patient's progress and deal with any day-to-day problems that arise in a timely manner.

Figure 2. Examples of ***caregiver-level*** dashboard features of the LifeguardMOBILE and LifeguardRx platforms.

(3) *Coordinate Care:* Caregivers can use this feature to communicate and work together with other members of the Circle of Care or primary health care providers, providing enhanced patient support and intervention if necessary.

(4) *Life Safety:* This map-based feature allows caregivers to locate patients and/or other Circle of Care member immediately in case of emergency or other situations that might affect patient safety.

Organization- and provider-level task domain dashboard features of LifeguardHCP (Figure 3):

For the patient who is actively managed by a clinical team, LifeguardRx and LifeguardHCP have been developed to serve the specific needs of the managed patient and their clinical care providers/health care organization, respectively. As noted above, LifeguardRx replaces LifeguardMOBILE for the actively managed patient, and this enhanced platform facilitates remote monitoring and customizing of care plans for patients, improving engagement, safety, and quality of care outside the hospital setting. Using LifeguardHCP, which includes additional monitoring and adherence-tracking features, providers can track patient compliance and program adherence as well as monitor health trends including vital signs, symptoms, and other care parameters. System alerts let both healthcare providers and caregivers know if a problem has arisen. Applied across a healthcare system, LifeguardHCP allows healthcare providers to scale their resources and best practices to ensure quality of care across at-risk populations. As illustrated in Figure 3, currently available features of LifeguardHCP include the following:

(1) *Evidence-base Care Plan:* Healthcare providers can create custom care plans to monitor and manage medications, vital signs, symptoms, and lifestyle and wellness goals.

(2) *Patient Daily Logs:* When a patient is out of compliance, the healthcare provider and organization is immediately notified by an alert.

(3) *Trending Reports:* Patient-tailored health trends are tracked to provide information on how the patient is doing and to identify emergent issues before they become more serious problems, thereby enabling early intervention.

(4) *Informed Consent:* This feature enables the healthcare organization and primary care providers to receive confirmation that care plan changes are accepted by the patient and are communicated to family caregivers, in-home nurses, and other patient-authorized members of the extended care team.

Figure 3. Examples of ***organization- and provider-level*** dashboard features of the LifeguardHCP platform.

Lifeguard Health Networks, Inc. has relationships with clinical health delivery organizations in both underserved urban and underserved rural communities. Lifeguard Health Networks, Inc has a focus not only on technical solution delivery to meet the health support needs of patients, their caregivers as well as the physicians and providers who deliver health and support services, Lifeguard has a secondary advocacy support mission. Lifeguard works with and is supported by national organizations which provide advocacy support to specific patient populations (e.g. cancer), and that drive public awareness to the masses as well as targeted campaigns to specific populations.

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